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Gingival Health and Alveolar Bone Loss Among Iraqi Overweight Primary School - Age Pupils (Radiographic Study)

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Key words
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Abstract

Many studies have found a strong association between obesity and various clinical and radiographical aspects of periodontal disease, most of these studies were directed toward adult age group only, while younger ages were omitted. To provide radiographic data about the effect of overweight on periodontal health status among Iraqi primary school-age pupils.The sample of this research was consist of 90 pupils of both gender (45 girls and 45 boys) with age range (6-12)years. All were examined clinically for bleeding on probing (BOP) and radiographically for alveolar bone loss (ABL). According to their percentile ranking the pupils in each gender group were divided into 3 subgroups (healthy weight, at risk of overweight and overweight). each subgroup was consist of (15 child). Greater mean values for BOP index were recorded for pupils in overweight group (0.8 for girls and 0.66 for boys) in comparison to those in healthy (0.26 for girls and 0.46 for boys) and at risk (0.4 for girls and 0.46 for boys), also greater mean values for ABL radiographically were recorded for pupils in overweight groups (1.53 mm for girls and 1.66 mm for boys) in comparison to those healthy (1.00 mm for girls and 0.8 mm for boys) and at risk (1.06 mm for girls and 1.46 mm for boys). According to paired t- test most of these differences were found to be statistically significant. On the other hand, No significant difference were recorded between different study groups on gender basis**.** There is a clear relation between obesity and periodontal health on both clinical and radiographical examinations.

Introduction

The global obesity epidemic has been described by the world health organization as one of the most blatantly visible, till now most neglected public health problems that threatens to overwhelm both developing and developed countries. It represents a complex chronic condition that develops from an interaction of genotype and the environment [(1)]. Body Mass Index (BMI) is defined as a simple index of weight for height which commonly classify peoples according to their weight. It is defined as the weight in Kilograms divided by the square of height measured in meters (Kg/m^2). According to the national center for health statistics (NCHS), this index used as following: -

For Adults (20 years old and older), the standard weight status categories associated with BMI ranges for adults are as following:

BMI	Weight status
Below 18.5	Underweight
18.5 – 24.9	Healthy
25 – 29.9	Overweight
30 and above	Obese

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While for children and teenagers, 1st determine the BMI then the BMI number is plotted on the BMI for age growth charts for either girls or boys (appendix 1)to get a percentile ranking. The Percentile ranking indicates the relative position of the child's BMI numbers among children of the same gender and age. BMI for age weight status categories and the corresponding percentiles for children are shown in the following table:

Weight status	Percentile range
Underweight	Less than the 5th percentile
Healthy weight	5th percentile up to 84th percentile
At risk of overweight	85th to less than 95th percentile
Overweight	Equal or greater than 95th percentile

Association of obesity to periodontal health was explored in several studies on both animal and human levels [2,3] . A various cross – sectional studies have found a strong association between obesity and various clinical and pathological aspects of periodontal disease [4-8] . The association between obesity and periodontitis is considered to be bidirectional relationship, periodontal disease may exacerbate dyslipidemia [9], and the latter may by exacerbated by some conditions associated with obesity for example, the metabolic syndrome, a clustering of dyslipidemia and insulin resistance [10]. A number of previous studies have investigated the incidence and prevalence of periodontal disease in children. The methods used have ranged from clinical measurements to radiographic assessments [11-13]. Two methods are frequently used to assess the presence and severity of periodontal disease, namely radiographic assessments of alveolar bone height and clinical assessment of probing depth. Oral radiological examination of marginal bone level is one way to study progression of periodontal diseases where marginal alveolar bone is affected. Marginal bone height as a marker for progression of periodontal disease has been recorded in some longitudinal studies [14, 15]. Numerous studies have confirmed a reduction in alveolar bone crest height with age both in healthy subjects and in those with periodontal disease [16,17]. Studies regarding the effect of overweight on periodontal health status of children are very poor in our country [18]. Moreover, this relation not being investigated on radiographical basis. For these reasons, the present study was conducted to provide a radiographical baseline data about this important hazardous relation.

Materials and Methods

This research was conducted on Iraqi primary school- age pupils attending the POP department in college of dentistry / Al-Mustansyria University seeking for different types of dental treatment. All Pupils' parents were interviewed and a permission was taken from them to conduct this study on their pupils. The research was conducted on (90) pupils of both gender (45 girls and 45 boys) with age range (6-12) years. All of them were healthy with no history of any systemic disease. All pupils were examined for bleeding on probing index (BOP) on dental chair using sterile dental mirror and periodontal props. A mean score per pupil then calculated for that index. Periapical radiographical examination for lower anterior area were taken to estimate the amount of interdental bone loss using parallel technique to overcome the possibility of magnification. The weight and height of each child was measured using a digital weight scale and tape measure to calculate their BMI, and the number is plotted on the BMI for age growth charts for either girls or boys to obtain a percentile ranking for each gender. According to the resultant percentile ranking, the pupils in each gender group were divided into three subgroups (healthy weight, at risk of overweight and overweight). Each sub group consisted of 15 pupils. These examination were carried out by well trained dentist who was calibrated with other qualified dentist. Collected data then submitted to both descriptive and inferential statistical analysis using SPSS V16. Program for Windows.

Results

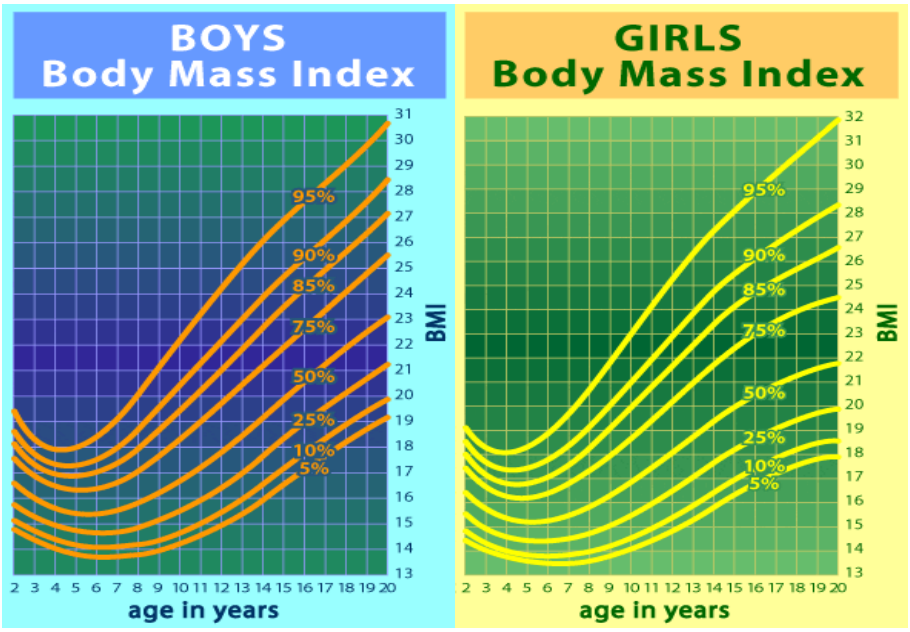
Descriptive statistics for BOP and ABL in all study groups, including means, standard deviation, minimum and maximum values of the study parameters, distribution of the sample by gender and allocation of the sample to different study groups were all showed by table (1). It's clear that **:**

Greater mean values of BOP index were recorded for pupils in overweight group (0.8 for girls and 0.66 for boys) in comparison to those in healthy (0.26 for girls and 0.2 for boys) and at risk (0.4 for girls and 0.46 for boys), also greater mean values for ABL radiographically were recorded for pupils in overweight groups (1.53 mm for girls and 1.66 mm for boys) in comparison to those healthy (1.00 mm for girls and 0.8 mm for boys) and at risk (1.06 mm for girls and 1.46 mm for boys). In more detailed comparative figure, Table (2) showed that paired sample t-test for study parameters in girls showed that differences in BOP were significant ($p \leq 0.05$) between healthy and overweight groups and between at risk and overweight groups. While it was not significant between healthy and at risk groups. The difference in alveolar bone loss was significant between healthy and overweight groups while it was not significant between at risk and overweight groups and between healthy and at risk groups. On the other hand, Table (3) showed that paired sample t-test for BOP parameter in boys revealed a significant difference ($p \leq 0.05$) present between healthy and overweight groups and non significant difference for other two relations. In regard with alveolar bone loss, the differences were significant between healthy and other two groups (at risk & healthy). This difference was not significant between at risk and overweight groups. Table (4) showed the paired sample t-test of study parameters on a gender bases, it was clear that the difference between matched groups of girls and boys were NS for both study parameters.

Discussion

This research may be the path finder research in its subject in Iraq and can enrich the very poor data regarding the radiographical estimation to the relation of obesity to periodontal disease in pupils. On the other hand, carrying out this research on a school age pupils takes its importance from the well accepted fact that identification of periodontal disease in younger age group is very important in term of prevention and providing primary health care for affected pupils [(18)].The findings of the present study provide another supporting clue on the relation of obesity to oral hygiene level and gingival health. This is very clear from the greater values of study parameters among overweight children in comparison to healthy ones. The addition advantage of this research is represented by providing a useful baseline data on this relation in younger age group, the data that is clearly not available in our area in general and in our country in particular. Radiographical estimation of periodontal health carry an essential benefit, because using of clinical indices as BOP and Gingival Index (GI) cannot provide clear evidence about the hidden alveolar bone destruction associated with periodontal disease. The non significant differences of the results in both genders may indicate that obesity has its effect on periodontal health regardless of the gender, an accepted explanation for this relation may come from the fact that adipose tissue is an active endocrine organ that secretes numerous cytokines, or protein mediators, collectively known as adipokines. These inflammatory mediators have a potent role in both inflammation and immune responses associated with periodontal disease [(19)].However it is not significant, the slight difference in study parameters between girls and boys (in favorite of girls) may indicates that girls take care of themselves better than boys did. In conclusion, This research has documents the relation of obesity to periodontal health in pupils regardless of their genders. More studies should be carried out by increasing the sample size and/or involving different samples

geographically and socioeconomically. It is also mandatory to conduct more studies involving different types of obesity (waist-hip or upper body) as they could react with periodontal disease differently.



Appendix (1):- BMI for age growth charts for girls and boys.

Table (1):- Descriptive Statistics for BOP & ABL parameters in all study groups.

Gender	Index	Group	No	Minimum	Maximum	Mean	S.D
Girls	BOP	Healthy	15	0	1	0.2667	0.45774
		At risk	15	0	1	0.4000	0.50709
		Overweight	15	0	1	0.8000	0.41404
	ABL	Healthy	15	0	2	1.0000	0.75593
		At risk	15	0	3	1.0667	0.88372
		Overweight	15	0	3	1.5333	0.74322
Boys	BOP	Healthy	15	0	1	0.2000	0.41404
		At risk	15	0	1	0.4667	0.51640
		Overweight	15	0	1	0.6667	0.48795
	ABL	Healthy	15	0	2	0.8000	0.77460
		At risk	15	0	3	1.4667	1.06010
		Overweight	15	1	3	1.6667	0.81650

Table (2):- Paired sample t-test for both study parameters in girls.

index	Compared Group	Mean	S.D	SEM	t	df	p	Sig.*
BOP	Healthy – At Risk	-0.13333	0.63994	0.16523	-0.807	14	0.433	NS
	Healthy - Overweight	-0.53333	0.63994	0.16523	-3.228	14	0.006	S
	At Risk - Overweight	-0.40000	0.50709	0.13093	-3.055	14	0.009	S
ABL	Healthy – At Risk	-0.06667	0.96115	0.24817	-0.269	14	0.792	NS
	Healthy - Overweight	-0.53333	0.91548	0.23637	-2.256	14	0.041	S
	At Risk - Overweight	-0.46667	0.91548	0.23637	-1.974	14	0.068	NS

S.D standard deviation. SEM standard error mean. S significant NS not significant

Table (3):- Paired sample t-test for both study parameters in boys.

index	Compared Group	Mean	S.D	SEM	t	df	p	Sig.*
BOP	Healthy – At Risk	-0.26667	0.79881	0.20625	-1.293	14	0.217	NS
	Healthy - Overweight	-0.46667	0.51640	0.13333	-3.500	14	0.004	S
	At Risk - Overweight	-0.20000	0.77460	0.20000	-1.000	14	0.334	NS
ABL	Healthy – At Risk	-0.66667	1.11270	0.28730	-2.320	14	0.036	S
	Healthy - Overweight	-0.86667	1.12546	0.29059	-2.982	14	0.010	S
	At Risk - Overweight	-0.20000	1.42428	0.36775	-0.544	14	0.595	NS

S.D standard deviation. SEM standard error mean. S significant NS not significant

Table (4):- Paired sample t-test for study parameters in between girls and boys.

index	Compared Group	Mean	S.D	SEM	t	df	p	Sig.*
BOP	Healthy (girls vs. boys)	0.06667	0.59362	0.15327	0.435	14	0.670	NS
	Overweight (girls vs. boys)	0.13333	0.63994	0.16523	0.807	14	0.433	NS
	At Risk (girls vs. boys)	-0.06667	0.59362	0.15327	-0.435	14	0.670	NS
ABL	Healthy (girls vs. boys)	0.20000	1.08233	0.27946	0.716	14	0.486	NS
	Overweight (girls vs. boys)	-0.13333	1.30201	0.33618	-0.397	14	0.698	NS
	At Risk (girls vs. boys)	-0.40000	1.35225	0.34915	-1.146	14	0.271	NS

S.D standard deviation. SEM standard error mean. S significant NS not significant

References

1-Dennison EM, Syddal HE, Aihic Sayer A, Martin HJ, Cooper C; Hertfordshire Cohort Study Group. Lipid profile, Obesity and bone mineral density: Itertfordshire Cohort study. QJM 2007; 100(5): 297 – 303.

2-Perlstein MI, Bissada NF. Influence of obesity and hypertension on the severity of periodontitis in rats. Oral Surg Oral Med oral Pathol 1977: 43:707 – 719.

3-Saito T, Shimazaki Y. Metabolic disorders related to obesity and periodontal disease J. periodontology 2000, Vol, 43, 2007, 254 – 266.

4-Wood N, Johnson RB, Streckfus CF. Comparison of body composition and periodontal disease using nutritional assessment techniques. Third National Health and Nutrition Examination Survey (NHANESIII). J. Clin Periodontal. 2003; 30; 321 – 327.

5-Al – Zahrani MS, Bissada NF, Borawskit EA, Obesity and periodontal disease in young, middle aged, and older adults. J. Periodontal. 2003; 74, 610 – 615.

6-Alabdulkamin M, Bissada N, Al-Zahrani M, Ficara A, Siegel B. Alveolar bone loss in obese subject. J Int Acad Periodontal. 2005; 7, 34 – 38.

7-Nishida N, Tanaka M, Hayashi N, Nagata H, Takeshita T, Nakayama K, Morimoto K, Shizukuishi S. Determination of smoking and obesity as periodontitis risks using the classification and regression tree method. J Periodontal. 2005; 76, 923 – 928.

8-D' Aiuto F, Sabbah W, Netuveli G, Donos N, Hingorani AD, Deanfield J, Tsakos G. Association of the metabolic syndrome with severe periodontitis in a Large U.S. Population based survey. J Clin Endocrinal Metab. 2008; 93, 3989 – 3994.

9-Katz J, Mimstein E: Pediatric Obesity and periodontal disease: asystematic review of the literature. Quintessence Int. 2011 Jul – Aug; 42 (7): 595 – 9.

10-N Engl. Obesity and periodontitis J Med 1998; 339: 482 – 483/August 13, 1998.

11-Darby IB, Lu J, Calache H. Radiographic study of the prevalence of periodontal bone loss in Australian School – aged children attending the Royal dental hospital of Melbourne. J Clin Periodontal. 2005; 32 (9): 959 -65.

12-Jenkins SM, Dummer PM, Addy M. Radiographic evaluation of early periodontal bone loss in adolescents. An overview. J Clin Periodontal. 1991; 19 (6): 363 – 6.

13-Waite IM, Furniss JS, Wong WM. Relationship between clinical periodontal condition and the radiological appearance at 1st molar sites in adolescents. A 3 – year study. J Clin periodontal 1994; 21(3); 155 – 60.

14-Laurell 1. Romao C, Hugoson A. longitudinal study on the distribution of proximal sites showing significant bone loss. J Clin Periodontal 2003; 30: 346 – 352.

15-Jansson L, Laustedt S, Zimmerman M. Prediction of marginal bone loss and tooth loss a prospective study over 20 year J Clin Periodontal 2002; 29 : 672 – 678.

16-Suomi JD, Plumo J, Barbano JR. A Comparative study of radiographs and pocket measurements in periodontal disease evaluation. J Periodontal 1968; 39: 311 – 315.

17-Rohner F, Cimasoni G, Vuagnat P. Longitudianl Radiographical study on the rate of alveolar bone loss in patients of a dental school. J Clin Periodontal of 1983; 10: 643 – 651.

18-KadhimJ. Hana. Enas R. Naaom. ReemH. Majeed : Oral hygiene and gingival health among overweight Iraqi school – age children (clinical comparative study) J Bagh Coll Dentistry 2011;23(3): 97-101.

19-Page RC: The role of inflammatory mediators in the pathogenesis of periodontal disease. J Periodont Res 1991; 26:230.